Volunteer Lake Assessment Program Individual Lake Reports

MONOMONAC, LAKE, RINDGE, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	12,448	**Max. Depth (m):**	7.8	**Flushing Rate (yr^{-1}):**	3.6
Surface Area (Ac.):	711	**Mean Depth (m):**	2.8	**P Retention Coef:**	0.55
Shore Length (m):	17,200	**Volume (m^3):**	8,093,500	**Elevation (ft):**	1044

TROPHIC CLASSIFICATION

Year	Trophic class
2008	MESOTROPHIC
1976	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

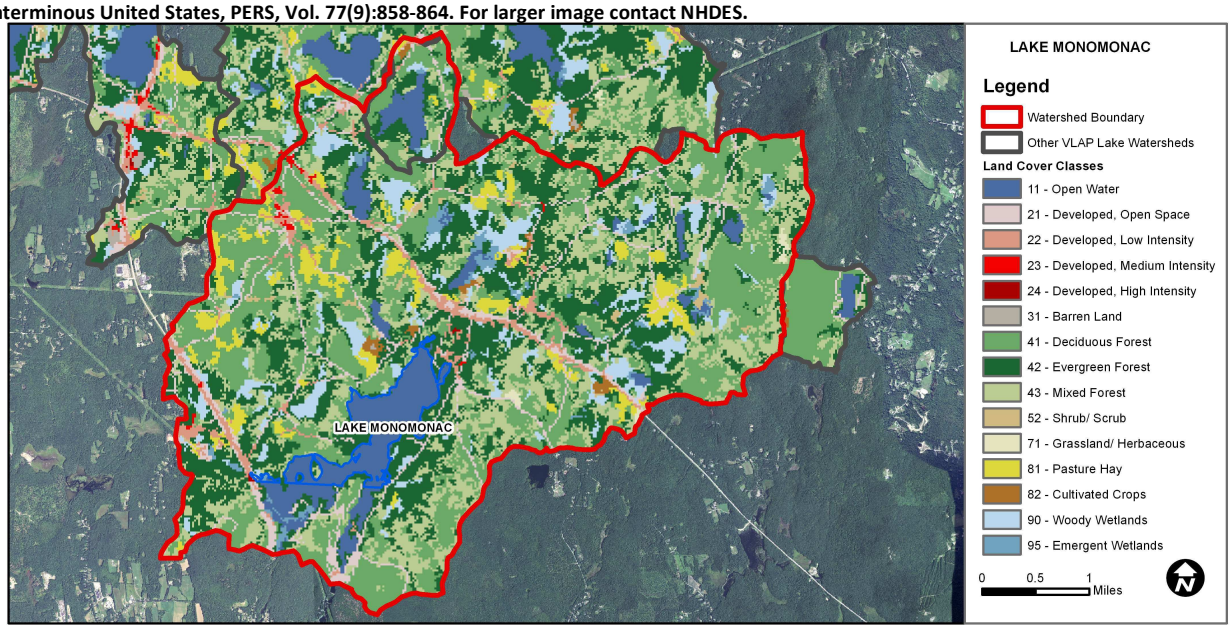
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Bad	>10%, with a minimum of 2, samples exceed criteria, with 1 or more by a large margin.
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Cautionary	There are < 10 samples with 1 exceedance of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Cyanobacteria hepatoto	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

MONOMONAC LAKE - CAMP MONOMONAC BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
MONOMONAC LAKE - CAMP MONOMONAC BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



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2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were average in July and then increased to slightly elevated levels in August. The 2014 average chlorophyll level remained greater than the state median, however decreased slightly from 2013. Historical trend analysis indicates relatively stable chlorophyll with moderate variability between years.
- **Conductivity/Chloride:** Deep spot and tributary conductivity and chloride levels were slightly greater than the state medians. Winter de-icing materials are likely the cause of the slightly elevated levels. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began.
- **E. coli:** Marina Inlet E. coli levels were stable and low, and much less than the state standard of 406 cts/100 mL for surface waters.
- **Total Phosphorus:** Epilimnetic phosphorus increased slightly from July to August but remained less than the state median and stable with 2013. Historical trend analysis indicates stable epilimnetic phosphorus levels since monitoring began. Hypolimnetic (lower water layer), Begun, Colburn, Converse, Dapkas, and Goddard Inlets, Loon Bay, State Line Inlet and Intermittent Stream, and Swan Point Inlet phosphorus levels were generally within a low to average range. Colburn Inlet phosphorus levels were slightly higher in July following a storm event. Marina Inlet phosphorus levels were slightly elevated in July and August.
- **Transparency:** Transparency decreased slightly from July to August likely due to the increased algal growth. Transparency improved slightly from 2013 but remained less than the state median. Historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began.
- **Turbidity:** Epilimnetic turbidity was elevated in July and August likely due to algal growth. Hypolimnetic turbidity was elevated in August potentially due to the accumulation of organic compounds as the summer progressed and dissolved oxygen levels were depleted. In general tributary turbidities were within average ranges for those stations. Swan Point Inlet turbidity was slightly elevated in July following a storm event.
- **pH:** Deep spot pH levels were slightly less than the desirable range 6.5-8.0 units and have historically fluctuated below the desirable range. Historical trend analysis indicates relatively stable epilimnetic pH with moderate variability between years. Tributary pH levels were also generally less than desirable. State Line Inlet pH levels were very low in July and the conductivity was very high suggesting possible contamination following the storm event.
- **Recommended Actions:** The worsening transparency is likely a result of elevated algal growth. Algae utilize nutrients such as phosphorus and nitrogen to grow. Educate lake residents on utilizing phosphate free fertilizers and proper application guidelines. The increased frequency and intensity of storm events and resulting stormwater runoff may be transporting excess nutrients and sediments to the lake. Educate lake and watershed residents on ways to manage stormwater runoff from their properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource. The worsening epilimnetic conductivity is likely a result of winter de-icing of roads, parking lots, driveways, and walkways. Encourage local road agents and winter maintenance companies to obtain a Voluntary NH Salt Applicator License through the UNH Technology Transfer Center's Green SnowPro Certification Program. For more information visit www.t2.unh.edu/green-snowpro-training-and-certification. Keep up the great work!

Station Name	Table 1. 2014 Average Water Quality Data for LAKE MONOMONAC								
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m NVS	Turb. ntu	pH
Epilimnion	2.80	5.41	20	90.9		10	2.53	1.45	6.45
Hypolimnion				91.3		8		4.41	6.29
Begun Inlet			20	93.3		7		1.34	6.35
Colburn Inlet			21	93.7		11		1.16	6.41
Converse Inlet			20	92.2		10		1.26	6.41
Dapkas Inlet			20	93.2		6		0.84	6.49
Goddard Inlet			20	94.4		9		1.20	6.48
Loon Bay			20	92.4		8		1.07	6.50
Marina Inlet			25	103.5	20	19		2.19	6.19
State Line Inlet			20	249.8		8		1.14	3.15
State Line Intermittent Stream			22	94.4		8		1.07	6.41
Swan Point Inlet			23	101.4		12		1.83	6.31

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data moderately variable.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Stable	Trend not significant; data show low variability.